TESTIMONY OF

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Good morning, Madam Chair and Members of the Committee. My name is Dr. George Gray, and I am the Assistant Administrator for Research and Development (ORD) at the U.S. Environmental Protection Agency (EPA). I also serve as the Agency's Science Advisor. Thank you for this opportunity to appear before the Committee to discuss an issue that is critically important to the American people and the future of our nation: the health of our children. EPA is committed to protecting children from exposures to harmful substances, and I appreciate your continued interest in our efforts. Today I will highlight several key EPA programs and regulations, which were put in place to ensure that we continue to protect children's health. I will also discuss some of EPA's ongoing scientific research and analyses on this topic, as well as publicly available resource guides related to children's health.

Focusing on Children: The Right Thing to Do

As a federal agency whose mission is to protect human health and the environment, safeguarding children from unsafe exposure to chemicals and other toxic substances is a top priority at EPA.

Because children are different from adults in several important ways, they may be more vulnerable to some health and developmental risks. First, because children are still growing and their neurological, immunological, respiratory, digestive, and other physical systems are still forming, they may be more at risk from harmful exposures that can disrupt their normal

development. Pound for pound, children also eat more, drink more, and breathe more than adults, so their food, water, and air must be safe. The way children play, infants crawl, and toddlers explore their world by placing things in their mouths increases the chances for exposure to environmental contaminants. Finally, children can be exposed to harmful substances in unique ways, such as through the placenta and breast milk. These special circumstances can make children more vulnerable to toxic substances in their environment.

On a personal note, as a parent with two growing children of my own, I know how important it is to base decisions on sound science and ensure our children are safe from environmental harm. That is why EPA is constantly seeking ways to enhance children's health, and why my office is producing and funding the best science to inform regulatory decisions.

EPA: A History of Protecting Children's Health

Since the establishment of EPA in 1970, we have taken leadership in the nation's efforts to protect children's health. For example, one of our earliest regulations mandated the removal of lead from gasoline, which continues to represent a landmark achievement in protecting children's health. The median concentration of lead in the blood of children 5 years old and under declined by 89 percent over the past 25 years.

In 1995, EPA established an Agency-wide policy to ensure that the unique vulnerabilities of children would be explicitly and consistently considered in our risk assessments, risk characterizations, and health standards. In 1996, the *National Agenda to Protect Children's Health from Environmental Threats* expanded the Agency's activities to specifically address risks for children. The Agenda directed EPA to:

- Ensure that all standards set by EPA are protective of any heightened risks faced by children.
- Develop a scientific research strategy focused on the gaps in knowledge regarding child-specific susceptibility and exposure to environmental pollutants.
- Develop new, comprehensive policies to address cumulative and simultaneous exposures faced by children.
- Expand community right-to-know, allowing families to make informed choices concerning environmental exposures to their children.

- Encourage parental responsibility for protecting children from environmental health threats by providing parents with basic information.
- Encourage and expand educational efforts with health-care providers and environmental professionals, so they can identify, prevent, and reduce environmental health threats to children.
- Provide the necessary funding to address children's environmental health as a top priority among relative health risks.

In 1997, the President signed Executive Order 13045: *Protection of Children's Health from Environmental Health Risks and Safety Risks*. The Order requires all federal agencies to assign a high priority to addressing health and safety risks to children, coordinate research priorities on children's health, and ensure that standards take into account special risks to children.

EPA established the Office of Children's Health Protection (OCHP) in 1997 to support the Agency as it embraced the 1996 National Agenda and the 1997 Executive Order. The mission of EPA's Children's Office is to make the health protection of children a fundamental goal of public health and environmental protection in the United States. The Office ensures that risks to children are considered in Agency activities, standards, and regulations. It also works to advance science relating to children's exposures and risks. For example, the Children's Office educates health care providers and jointly supports the Pediatric Environmental Health Specialty Units in partnership with the Agency for Toxic Substances and Disease Registry. The Office also supports critical efforts to develop indicators of children's environmental health, both domestically and internationally, and is an important partner with EPA on science and research related to children. Finally, the Office raises general awareness about children's environmental health issues and has been a leader in the Agency's efforts to address environmental health in schools.

To continually inform Agency initiatives related to children's health, EPA established the Children's Health and Protection Advisory Committee in 1997. Through the Committee, leading researchers, academics, health care providers, NGOs, industry representatives, as well as state and local government representatives advise EPA on regulations, research, and communications issues important to children's health.

Standards and Regulations

The Agency has worked to ensure that its standards and regulations consider the potential risks that children face from exposure to harmful chemicals and toxic substances. To assist in that effort, two publications help EPA staff determine whether the Executive Order or EPA's policy apply to specific Agency actions: *The Guide to Considering Children's Health When Developing EPA Actions: Implementing Executive Order 13045* and *EPA's Policy on Evaluating Health Risks to Children*. Since the 1998 issuance of the *Rule Writer's Guide to Executive Order 13405*, EPA has published several guidance documents related to risk assessment, regulatory policy, and action development.

The revision of the guide reflects new developments and more clearly integrates EPA's children's health policy with the action-development process for clean air, clean water, drinking water, pesticides, and toxics programs. The action-development process provides the framework for developing EPA regulations, and I would like to highlight some examples of how our regulatory process has addressed children's health concerns.

The Clean Air Act requires EPA to set National Ambient Air Quality Standards (NAAQS) for widespread pollutants from numerous and diverse sources considered harmful to public health and the environment. The Clean Air Act established two types of NAAQS. Primary standards set limits to protect public health, including the health of sensitive groups of the population. Secondary standards set limits to protect public welfare, including protection against visibility impairment, damage to animals, crops, vegetation, and buildings. The Clean Air Act requires periodic review of the science upon which the standards are based and the standards themselves. The NAAQS are an important mechanism for reducing children's exposure to pollutants that cause asthma and other health effects.

In September 2006, EPA issued the Agency's most protective set ever of NAAQS for particulate pollution, also called particulate matter, or PM. EPA selected levels for the final standards after completing an extensive evaluation of thousands of scientific studies about the potential impact of fine and coarse particulates on public health and welfare. EPA considered the advice provided by its Clean Air Scientific Advisory Committee at various points during this evaluation process. The Agency also carefully reviewed and considered public comment on the proposed

standards. Our estimates indicate that, in 2020, attaining the new 24-hour PM 2.5 standards have the potential to result in the following improvements in children's health:[1]

- 1,200 fewer emergency room visits for asthma;
- 7,300 fewer cases of acute bronchitis;
- 97,000 fewer cases of upper and lower respiratory symptoms; and
- 51,000 fewer cases of aggravated asthma.

On March 12, 2008, EPA significantly strengthened its NAAQS for ground-level ozone, the primary component of smog. As compared to the previous 8-hour NAAQS of 0.8 parts per million, the revised standard of 0.75 parts per million is estimated to provide the following benefits to children's health in 2020:[2]

- 4,900 fewer emergency room visits for asthma;
- 43,000 fewer cases of acute bronchitis;
- 1,000 fewer cases of lower respiratory symptoms; and
- 6,100 fewer cases of upper respiratory symptoms.

Finally, the Agency is in the process of reviewing the NOx and SOx NAAQS; among the health impacts being evaluated are the potential to exacerbate children's asthma. EPA will propose potential revisions to these standards in mid-2009.

Under the 1996 Amendments to the Safe Drinking Water Act, when EPA sets drinking water standards designed to strengthen protection of the public from the potential effects of contaminants in drinking water, EPA must consider segments of the population that are most at risk from the drinking water contaminants. In setting standards for drinking water contaminants, EPA conducts detailed analyses of available data to determine children's health risk. In the past few years, EPA has focused on setting or strengthening standards for controlling microbes, disinfection byproducts, and lead in drinking water. These include the Long Term 2 Enhanced Surface Water Treatment Rule, the Stage 2 Disinfectants and Disinfection Byproducts Rule and the Ground Water Rule, all promulgated in 2006, and Revisions to the Lead and Copper Rule, promulgated in 2007.

[1] For additional information and assumptions, see the regulatory impact analysis at the following website: http://www.epa.gov/air/particlepollution/fs20061006.html, http://www.epa.gov/ttn/ecas/regdata/RIAs/Chapter%205--Benefits.pdf

[2] For additional information and assumptions, see the regulatory impact analysis at the following website: http://www.epa.gov/ttn/ecas/regdata/RIAs/6-ozoneriachapter6.pdf

EPA is concerned about the potential sensitivity of children to exposure from pesticides compared to adults. Protecting children from potential effects of pesticides is an important aspect of EPA's Pesticide Program. The Food Quality Protection Act requires EPA to place particular emphasis on children in making regulatory decisions about pesticides. Risk assessments include evaluations for children in various age groups, since children's eating and activity patterns change as they grow up.

Another area of critical importance to children's health is lead exposure In the past 30 years, the average blood-lead concentration in children has declined dramatically from 15 micro-grams per deciliter to less than 2 micro-grams per deciliter due changes in product formulation (gasoline and house paint). However, studies continue to show health problems related to lead exposure, so there is more work to be done to reduce children's exposure. This need led EPA to promulgate its Renovation, Remodeling, and Painting Rule regarding lead. This rule is designed to minimize children's lead exposure as a result of renovation activities by ensuring that safe occupational practices are used by renovators in these homes, and providing training for workers. The rule's estimates of lead exposure and its estimates of health effects to children from lead are based on extensive research and modeling conducted by EPA's Office of Research and Development. Additionally, Agency researchers are working with outside vendors to develop lead-paint test kits to meet the specifications of the rule. Performance of the test kits will be independently verified through EPA's Environmental Technology Verification program.

The Agency is also currently reviewing and revising the NAAQS for lead. The Agency has reviewed thousands of studies on the health and environmental impacts of lead as part of the NAAQS process and has obtained advice from its expert scientific panel. Several of the studies evaluated focus on lead exposure to children, and these studies will be an important factor in the Agency's decision on a revised lead NAAQS. We anticipate issuing the final rule on the revised lead NAAQS in mid-October.

Research, Analysis, and Resource Guides

EPA has conducted and facilitated, at our own labs and research centers, and also through extramural grants, research projects that provide essential information related to children's health. EPA has worked collaboratively with other Agencies to support basic research on children's health issues in order to better understand child-specific risk factors and identify opportunities to reduce children's risks. EPA has developed, and made publicly available, a number of documents that provide guidance to researchers and the public about how to use scientific data when assessing children's exposures or health risks. The following section highlights several key examples of our children's health accomplishments related to research, analysis, and resource guides.

EPA's National Center for Environmental Research actively supports extramural research on topics related to children's environmental health through its Science to Achieve Results (STAR) program. EPA's 2007 report, *A Decade of Children's Environmental Health Research*, summarizes many of the accomplishments of EPA's grants in this area. Examples of research topics include the effects of pesticides on neurodevelopment; impacts of the ban of chlorpyrifos and diazinon; link between immune system abnormalities and autism; genetic vulnerability of children to the effects of organophosphate pesticides; and the relationship between children raised near major roadways and the risk of developing asthma.

Since 1998, EPA and the National Institute of Environmental Health Sciences (NIEHS) have funded fourteen independent, academic Centers for Children's Environmental Health and Disease Prevention Research. These Centers are dedicated to the study of children's environmental health hazards; they translate their scientific findings into intervention and prevention strategies by working with communities. The first eight centers were funded in 1998 to study the effects of environmental factors, such as pesticides and air pollution, on childhood asthma as well as children's growth and development. Four more Centers were funded in 2001 to study the basis of neuro-developmental and behavioral disorders, such as autism. Additional Centers were funded in 2004 and 2007 to investigate how exposure to mixtures of chemicals affects children's health, and also how environmental, social, and other factors contribute to health disparities in birth outcomes. Each Center fosters community participation in one or more studies.

EPA's intramural research program is complementary to, and integrated with, its extramural STAR program. This research informs current risk assessments and ongoing epidemiological and observations studies. EPA is identifying critical windows of exposure during fetal and early life; revealing how endocrine-active compounds mimic hormones and disrupt normal development of the nervous and reproductive systems; determining the importance of allergens, such as mold and air pollution, in inducing or exacerbating childhood asthma; improving experimental protocols and test methods to identify and characterize contaminants that might impact children's health; and developing better methods and models to assess cumulative exposures and toxicity.

EPA, as part of a consortium of federal partners, has contributed to the planning of the *National Children's Study*. This first-of-a-kind study will examine the influence of the social and physical environment, as well as the genetic influences on the health and development of more than 100,000 children across the United States, following them from before birth until age 21. The goal of the study is to improve the health and well-being of children. The National Children's Study (then called the Children's Longitudinal Cohort Study) was authorized by the U.S. Congress and signed into law on October 17, 2000 as a part of the Children's Health Act of 2000 (Public Law 106-310).

EPA has developed many publications and resource guides to assist researchers and the public in collecting data, identifying the best available science, and characterizing potential exposures and risks to children. For example, EPA's 2002 *Child-Specific Exposure Factors Handbook* provides a well-researched summary of data and recommendations for the use of specific exposure factors or activity patterns when assessing exposures to children. These exposures include those related the following: drinking water consumption, soil ingestion and mouthing behavior, inhalation rates, dermal factors, breast milk intake, and time spent in different locations or performing different activities.

EPA guidelines are developed with cross-Agency concurrence to ensure consistency and transparency in risk assessment, and they undergo external peer review and public comment. EPA's 2005 *Guidelines for Carcinogen Risk Assessment* and *Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens* describe how quantitative scientific data can be used to inform risk assessments. These assessments cover exposure to carcinogens during infancy and childhood and, under the Guidelines, help identify when an

assessor should apply age-dependent adjustment factors to provide additional protection for children. In 2007, EPA released a draft report entitled *Framework for Determining a Mutagenic Mode of Action for Carcinogenicity* for public comment and expert peer review. This proposed Framework provides guidance on the application of age-dependent adjustment factors for children by presenting a methodology for evaluating whether a chemical has a mutagenic mode of action for carcinogenicity.

EPA's 2005 *Guidance on Selecting Groups for Monitoring and Assessing Childhood Exposures to Environmental Contaminants* also provides guidance on how to select appropriate age groups when assessing childhood exposures to environmental contaminants. EPA's 2006 report, *A Framework for Assessing Health Risks of Environmental Exposures to Children* provides additional information on how to assess children's health risks based on existing EPA guidelines and policies. The Framework serves as a guide for conducting more complete assessments of the health risks to children during all stages of development. In *Scientific and Ethical Approaches for Observational Exposure Studies*, released in May 2008, EPA identifies key scientific and ethical issues and provides information and resources to assist researchers as they plan and implement observational exposure studies, including those that involve children.

Conclusion

Thank you, Chairwoman Boxer, and members of the Committee. I appreciate your dedication to children's health and your interest in EPA's efforts. EPA embraces its mission to protect the environment and safeguard human health. We take extra precaution to protect those who are most vulnerable to contaminants in the environment, especially children. I look forward to answering any questions you may have. Thank you for your time.